



# Overcoming the impacts of aquaculture on the coastal zone

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## Abstract

The wide variety of goods and services provided by the coastal zone (food, medicines, nutrient recycling, control of flooding, typhoon protection) account for its many uses (fisheries, aquaculture, agriculture, human settlements, harbors, ports, tourism, industries). Aquaculture now provides a third of total fisheries production. Half of the total aquaculture yield comes from land-based ponds and water-based pens, cages, longlines and stakes in brackish water and marine habitats. But the opportunities for employment, income and foreign exchange from coastal aquaculture have been overshadowed by negative environmental and social effects. The environmental impacts include: mangrove loss, bycatch during collection of wild seed and broodstock, introductions and transfers of species, spread of parasites and diseases, misuse of chemicals, and release of wastes. The socioeconomic impacts include: privatization of public lands and waterways, loss of fisheries livelihoods, food insecurity, and urban migration. The paper gives recommendations on the attainment of responsible and sustainable aquaculture with emphasis on herbivorous and omnivorous species, polyculture, integration with agriculture and mangroves, and self-regulation in the form of codes of conduct and best management practices. Recommended approaches include holistic Integrated Coastal Zone Management based on stakeholder needs, mechanisms for conflict resolution, assimilative capacity of the environment, protection of community resources, and rehabilitation of degraded habitats, to improvements in the aquaculture sector pertaining to management of feed, water, and effluents.

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1. Introduction

Since time immemorial, the coastal zone has been a center of human activity because of its high biological productivity and easy accessibility—close to half of the world’s population resides within 100 km of the coastline. The wide variety of goods and services provided by mangroves, seagrasses, coral reefs and other coastal ecosystems include the production of aquatic plants and animals used for food, medicines, construction and other human needs; recycling of nutrients and filtration of pollutants; control of flooding and soil erosion; and protection from typhoons, storm surges and tsunamis. The global value of coastal ecosystems has been estimated at US\$12.57 trillion/year and those of mangrove forests, together with tidal marshes, at US\$1.65 trillion/year [1]. The many uses of the coastal zone include artisanal and commercial fisheries; aquaculture; agriculture; human settlements; harbors, ports and navigation; recreation and tourism; and mining and industries. Such multiple uses have given rise to conflicts over resource use. In recent years, some of the most controversial conflicts have been related to the apparent and potential negative impacts of aquaculture.

2. Aquaculture

In 2002, aquaculture worldwide produced a total of 51.4 million metric tones (mmt) valued at US\$60 billion [2]. Freshwater fish contributed 47.7% of volume, followed by mollusks (22.9%), plants (22.6%) and crustaceans (4.2%) (Fig. 1). Aquaculture harvests were predominantly from Asia (91.2%), followed by Europe (4.0%) and the Americas (3.6%). Around 55% of production in 2001 came from land-based ponds and water-based pens, cages, longlines and stakes in brackish water and marine habitats; freshwater habitats contributed ~45%. Table 1 matches commodities to their respective production systems, e.g., ponds and pens.

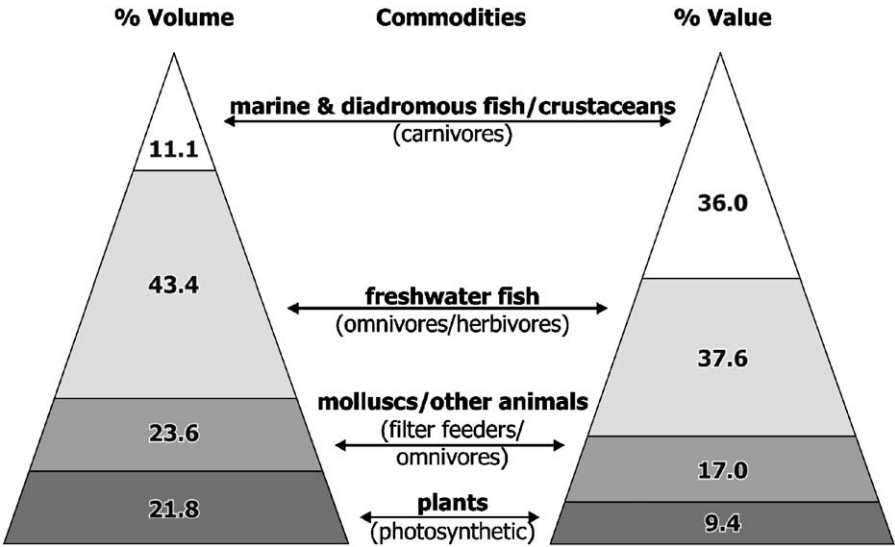


Fig. 1. 2001 World Aquaculture Production (FAO, 2002) = 48.4 million metric tons (mmt), US\$ 61.5 billion (values not drawn to scale).

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